

Claims

- [c1] A dual polarized integrated antenna comprising:
- a quadrifilar radiator;
 - a printed circuit board having a ground plane on an upper surface, wherein the quadrifilar radiator is centrally disposed upon the ground plane;
 - a plurality of lower surface micro-strip traces disposed on a lower surface of the printed circuit board; and
 - a monopole array mounted on the printed circuit board and contactingly engaging the plurality of lower surface micro-strip traces.
- [c2] The dual polarized integrated antenna of claim 1 wherein the quadrifilar radiator comprises:
- a cylindrical dielectric element having an outer surface with a plurality of interleaved radiator micro-strip traces disposed thereon;
 - a radiator coaxial cable interiorly disposed within the cylindrical dielectric element; and
 - a balun disposed between the radiator coaxial cable and the radiator micro-strip traces.
- [c3] The dual polarized integrated antenna of claim 2 wherein the quadrifilar radiator is a three-quarter turn circularly polarized quadrifilar radiator.
- [c4] The dual polarized integrated antenna of claim 1 wherein the monopole array comprises four vertically polarized monopole elements disposed on the printed circuit board, each vertically polarized monopole element disposed equidistant from the quadrifilar radiator.
- [c5] The dual polarized integrated antenna of claim 4 wherein the vertically polarized monopole elements are operably connected via the lower surface micro-strip traces.
- [c6] The antenna of claim 2 further comprising:
- a lower surface coaxial cable operably coupled to the plurality of lower surface micro-strip traces; and
 - a radiator coaxial connector operably coupled to the radiator coaxial cable.

- [c7] The dual polarized integrated antenna of claim 1 wherein the quadrifilar radiator comprises:
- a radiator coaxial cable extending upward through the printed circuit board;
 - a balun disposed at a top portion of the radiator coaxial cable; and a plurality of cross-v dipole antennas operably coupled to the balun and extending from the top portion of the radiator coaxial cable to the ground plane of the printed circuit board.
- [c8] The dual polarized integrated antenna of claim 7 wherein the plurality of cross-v dipole antennas are operably coupled to the ground plane at a forty-five degree angle.
- [c9] The dual polarized integrated antenna of claim 8 wherein the monopole array comprises four vertically polarized monopole elements disposed on the printed circuit board, each vertically polarized monopole element disposed equidistant from the quadrifilar radiator.
- [c10] The dual polarized integrated antenna of claim 9 further comprising:
- a radiator coaxial connector operably coupled to the radiator coaxial cable;
 - a lower surface coaxial connector operably coupled to the lower surface micro-strip traces of the monopole array; and
 - a lower surface coaxial cable operably coupled to the lower surface micro-strip traces via the lower surface coaxial connector.
- [c11] The dual polarized integrated antenna of claim 1 wherein the antenna is self-phasing.
- [c12] A dual polarized integrated antenna comprising:
- a quadrifilar radiator comprising:
 - a cylindrical dielectric element having an outer surface with a plurality of interleaved radiator micro-strip traces disposed thereon;
 - a radiator coaxial cable interiorly disposed within the cylindrical dielectrical element; and
 - a balun disposed between the radiator coaxial cable and the radiator micro-strip traces;

a printed circuit board having a ground plane on an upper surface, wherein the quadrifilar radiator is centrally disposed upon the ground plane;
a plurality of lower surface micro-strip traces disposed on a lower surface of the printed circuit board; and
a monopole array mounted on the printed circuit board and contactingly engaging the plurality of lower surface micro-strip traces.

[c13] The dual polarized integrated antenna of claim 12 wherein the quadrifilar radiator is a three-quarter turn circularly polarized quadrifilar radiator.

[c14] The dual polarized integrated antenna of claim 12 wherein the monopole array comprises four vertically polarized monopole elements disposed on the printed circuit board, each vertically polarized monopole element symmetrically disposed about the quadrifilar radiator.

[c15] The dual polarized integrated antenna of claim 14 further comprising:
a lower surface coaxial cable operably coupled to the plurality of lower surface micro-strip traces via a lower surface coaxial connector.

[c16] A dual polarized integrated antenna comprising:
a printed circuit board having a ground plane on an upper surface;
a quadrifilar radiator comprising;
a radiator coaxial cable;
a balun disposed at a top portion of the radiator coaxial cable; and
a plurality of cross-v dipole antennas operably coupled to the balun and extending from the top portion of the radiator coaxial cable to the ground plane of the printed circuit board;
a plurality of lower surface micro-strip traces disposed on a lower surface of the printed circuit board; and
a monopole array operably mounted on the printed circuit board and contactingly engaging the plurality of lower surface micro-strip traces.

[c17] The dual polarized integrated antenna of claim 16 wherein the plurality of cross-v dipole antennas are operably coupled to the ground plane at a forty-five degree angle.

- [c18] The dual polarized integrated antenna of claim 16 wherein the monopole array comprises four vertically polarized monopole elements disposed on the printed circuit board, each vertically polarized monopole element disposed equidistant from the two nearest vertically polarized elements, defining an area configured as a square.
- [c19] The dual polarized integrated antenna of claim 18 further comprising:
a radiator coaxial connector operably coupled to the radiator coaxial cable;
a lower surface coaxial connector operably coupled to the lower surface micro-strip traces of the monopole array; and
a lower surface coaxial cable operably coupled to the lower surface micro-strip traces via the lower surface coaxial connector.
- [c20] A dual polarized integrated antenna comprising:
a three quarter turn circularly polarized quadrifilar radiator comprising:
a cylindrical dielectric element having an outer surface with a plurality of interleaved radiator micro-strip traces disposed thereon;
a radiator coaxial cable interiorly disposed within the cylindrical dielectrical element; and
a balun operably disposed between the radiator coaxial cable and the radiator micro-strip traces;
a printed circuit board having a ground plane on an upper surface, wherein the three-quarter turn circularly polarized quadrifilar radiator is centrally disposed upon the ground plane;
a plurality of lower surface micro-strip traces disposed on a lower surface of the printed circuit board;
a monopole array comprising four vertically polarized monopole elements operably coupled, via the lower surface micro-strip traces, to the printed circuit board, wherein each vertically polarized monopole element is disposed a desired distance from the quadrifilar radiator such that the vertically polarized monopole elements in combination define an area configured as a square; and
a lower surface coaxial cable operably coupled to the plurality of micro-strip traces via a lower surface coaxial connector.